REMARKS

Claims 25–48 are pending. Claims 25 and 33 have been amended.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 25–48 stand rejected as unpatentable under 35 U.S.C. § 103(a) over Naji et al. (US 6,030,447) with or without Hillstrom et al. (US 4,138,313). A *prima facie* case of obviousness requires three showings: (1) a suggestion or motivation, in the references or in the knowledge of one skilled in the art, to modify the reference or to combine reference teachings; (2) a reasonable expectation of success; and (3) a disclosure or suggestion in the reference(s) of all the claim limitations. The suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not in applicant's disclosure.

Independent claim 25 as amended is distinguishable from Naji et al. Claim 25 now recites: "A composite building material incorporating reinforcing cellulose fibers, wherein at least a portion of the fibers comprises high temperature pre-washed fibers having a COD content less than about 5 kg/ton." Naji does not disclose the COD of the fibers used in the cement formulations disclosed therein. Nevertheless, the Examiner states that "The mechanical fibers of NAJI et al would have very low CODs as mechanical pulp is not chemically treated and would not contain residual chemicals from chemical pulping." Applicants respectfully submit that, contrary to the Examiner's statement, mechanically pulped fiber does *not* necessarily have "very low CODs." Because the fiber is not chemically treated, certain high COD components are not removed from mechanically pulped fibers, for example, lignin, as well as other non-water-soluble compounds. *See*, for example http://english.forestindustries.fi/products/pulp/mechanical.html ("Since the pulp obtained still contains lignin, the mechanical method yields twice as much pulp from the same quantity of wood raw material as the chemical process."), a copy of which is attached hereto as EXHIBIT A. Paragraph [0004] of the present disclosure states that lignin is a high COD component ("These organic compounds include *lignin* and other aromatic components … . These impurities are sometimes collectively referred to as Chemical Oxygen Demand (COD) components."). Accordingly, to the extent that Naji et al. does disclose mechanically pulped fibers, nothing would lead one skilled in the art to conclude that those fibers have a COD within the range recited in claim 25.

As the present application states in ¶ [0029], fibers produced by many pulping processes – including without limitation, kraft, kraft-AQ, soda, soda-AQ, kraft-oxygen, oxygen delignification, organic solvent, sulfite, and/or steam explosion – often have high COD. Column 2, lines 3–29 of Hillstrom et al. is to the same effect, stating that COD is an issue in both kraft and sulfite pulping. Accordingly, the question is not the particular pulping method used, it is the COD of the resulting fibers. As stated above, Naji et al. has no disclosure concerning the COD of fibers.

The Examiner further states that claim 25 is obvious over Naji et al. in view of Hillstrom et al. The Examiner has provided no motivation to combine Naji et al. and Hillstrom et al. Applicants respectfully submit that neither Naji et al. nor Hillstrom et al. provides any motivation to combine these references. Naji et al. neither discloses nor suggests anything about the COD of the fibers, let alone the desirability of a COD within the recited range. The Examiner states that cellulose fibers with a Canadian Standard Freeness (CSF) of 0–800 as disclosed in Naji et al. would inherently have a low COD. Applicants respectfully note that the Examiner has not provided any references teaching such a correlation, and Applicants are unaware of such a correlation.

Hillstrom et al. discloses that COD correlates with "washing losses," for example as disclosed at 16:43–47 ("There is an extremely good correlation between the washing losses recorded in Table IV and the corresponding values in Table V, obtained according to SCAN C 30:73."). Notably, Hillstrom et al. measures the COD of the wash water, *not* of the fibers. 10:49–56 ("The manner and stage at which the content of impurities of the suspending liquid is determined in shown in the FIGURE. A filtered liquid sample of *washed suspension liquid* is taken continuously from line **24** via line **34** to a continuously operating analyzer **35**, for example, a calorimeter, where the content of dissolved impurities is measured."). Although one might expect that these values are correlated, some impurities that contribute to COD are soluble only under certain conditions. For example, lignin is soluble under basic conditions, but not under acidic conditions. Depending on the pH of the wash water, lignin may or may not be removed from the fibers.

Moreover, Hillstrom et al. does not disclose or suggest that fibers with any particular COD level have any particularly desirable properties. Instead, the object of Hillstrom et al. is to assure that the wastewater discharged from the pulping plant meets the relevant environmental

standards. 5:12–21 ("Since there is no method for continuously determining washing losses, it has been very difficult for pulp manufacturing plants to maintain the amount of impurities discharged from the plant below the predetermined minimum set by the environmental control authorities. This naturally can seriously affect the operation of the plant, and can lead to heavy legal fines in the event that the limits imposed are violated, even though this be entirely accidental, and quite beyond the control of the mill operation."). In any event, Hillstrom et al does not disclose or suggest the desirability of using cellulose fibers with low COD in cementitious applications, and consequently, Hillstrom et al. provides no motivation to one skilled in the art to combine it with Naji et al.

The Examiner further states that "It would have been obvious to increase the washing time of Naji et al to further decrease the COD, e.g. below 5 kg/ton." First, Applicants respectfully submit the Naji et al. does not disclose washing cellulose fibers nor the desirability of fibers that have been washed in elevated temperature conditions. Second, to the extent that Naji et al. does disclose washing fibers, the Examiner appears to be arguing that one skilled in the art would optimize the wash time. Applicant respectfully submits that a rejection based on "optimum or workable ranges" is inappropriate where the prior art does not teach or suggest the desirability of the result achieved. As discussed in MPEP § 2144.05, "[a] particular parameter must first be recognized as a result-effective variable, *i.e.,* a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (C.C.P.A. 1977). Thus, for a rejection to be made based on "optimum or workable ranges," the prior art must first identify the result which the variable achieves. As noted above, neither Naji et al. nor Hillstrom et al. disclose or suggest the desirability of any particular COD value for fibers used in cementitious formulations. As such, this variable is not recognized in either reference, and consequently, the rejection is inappropriate.

For all of these reasons, Applicants respectfully submit that the rejection of claim 25 is overcome. Because claims 26–32 are dependent on claim 25 and recite additional features, Applicants respectfully submit that the rejections of these claims are also overcome. Independent claim 33 recites a formulation comprising a cementitious binder and "cellulose fibers, wherein at least a portion of the fibers comprise low COD fibers, wherein the low COD fibers have a COD content of less than about 5 kg/ton of oven dried pulp." For the same reasons as stated above for

claim 25, Applicants respectfully submit that claim 33 is allowable over the art of record. Furthermore, because claims 34–48 are dependent on claim 33 and recite additional features, Applicants respectfully submit that the rejections of these claims are also overcome.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Frontpage	Companies	Products	Finance and labour	Forest	Environment	Press releases	Publicatio

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- **Pulp and paper**
  - **Pulp production**
  - **Mechanical pulp production**
  - **Paper and board production**
  - **Raw materials**
- **Wood products**
- **Production volumes**
- **Future products**
- **Research and development**
- **Manufacturers**

Mechanical pulp production

In mechanical pulping, wood fibres are separated from each other through mechanical abrasion. The mechanical force is transformed into heat which softens the lignin that holds the fibres together.

This softening and breaking of bonds is accelerated by feeding steam into the process. Since the pulp obtained still contains lignin, the mechanical method yields twice as much pulp from the same quantity of wood raw material as the chemical process.

Groundwood pulp and refiner mechanical pulp

Mechanical pulp is made in two ways: grinding and refining.

The raw material used in the grinding process consists of debarked spruce logs cut into specific length. They are then pressed against a rotating grindstone, and the grinding can be intensified with pressure (pressurized groundwood pulp, or PGW).

In the refining method, the raw material is spruce chips, which are ground into pulp between refiner discs. The efficiency of this process can be enhanced by using heat and steam (yielding thermomechanical pulp, TMP) or chemicals (when the result is called chemithermomechanical pulp, CTMP).

- **Facts and figure**

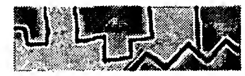

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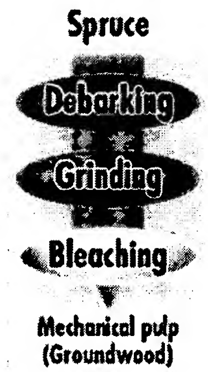
Exhibit A



Mechanical pulp for printing papers

Mechanical pulp is used in the production of printed papers due to its good printing properties. It is used as much as possible in printing papers, because good printability is the paper's most important property.

The drawback in using paper made of groundwood pulp and refiner mechanical pulp is that is tends to yellow over time. This is caused by the lignin that it contains.

The positive aspect of mechanical pulp making is its high product yield relative to raw material input; the downside is that it requires a lot of energy.